

Fertile corals discovered in deeper waters off US Virgin Islands

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Diverse and vibrant deep coral reefs of the Grammanik Bank, St. Thomas, US Virgin Islands are shown. The dominant corals are boulder star corals (*Orbicella franksi*). The two groupers are yellowfin groupers (*Mycteroperca venenosa*). Credit: Tyler B Smith - April 22, 2012

Researchers discovered a threatened coral species that lives in deeper waters off the U.S. Virgin Islands is more fertile than its shallow-water counterparts. The new study showed that mountainous star corals (*Orbicella faveolata*) located at nearly 140 feet (43 meters) deep may produce one trillion more eggs per square kilometer (247 acres) than those on shallow reefs. The findings from scientists at the University of Miami (UM) Rosenstiel School of Marine and Atmospheric Science and the University of the Virgin Islands have important implications for the future of coral reefs worldwide.

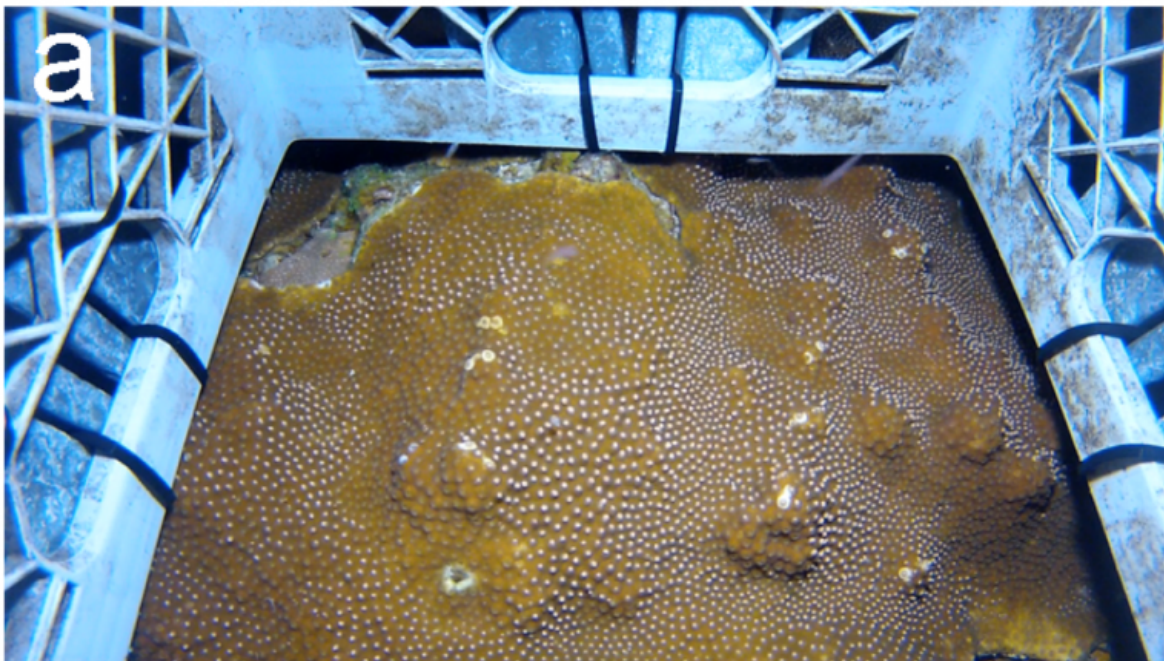
Caribbean [coral reefs](#) have declined 50 percent in the past 50 years, according to the 2014 Status and Trends of Caribbean Coral Reefs report. In 2005, coral reefs in the U.S. Virgin Islands were severely impacted by high temperatures and disease.

"Coastal pollution, storms, and warm water can stress a coral out, which is why we're looking at what's going on in deeper offshore habitats," said Daniel Holstein, a UM Rosenstiel School alumnus and current post-doctorate researcher at the University of the Virgin Islands. "These deeper habitats tend to be cooler and less strenuous for corals - and thus, coral spawning may be more spectacular."

Mountainous star corals reproduce by broadcast spawning, where corals release their eggs and sperm in the water during a highly synchronized event. The researchers used remote cameras at a field site off the island of St. Thomas and laboratory observations during broadcast spawning events to show that the mesophotic corals, which live in deeper reef waters typically between 30 - 150 meters (98 - 492 feet), released their eggs in near synchrony with shallow-water corals.

"The reefs that produce more larvae are more likely to be successful in seeding the reefs with their offspring," said Claire Paris, associate professor of ocean sciences at the UM Rosenstiel School and co-author

of the study. "Protecting these potent reproductive deep refuges could represent the key to the survival of coral reefs for future generations."



The team observed deep (mesophotic) star corals spawning both in the field and in the lab. (Top) Very difficult to observe in the field, a star coral spawns at ~38 m (125 ft). Egg and sperm bundles can be seen "setting" in the polyp oral openings. (Bottom) A fragment of a deep star coral spawns in the lab, and the egg and sperm bundles can be seen rising to the surface of a sample jar. Credit: Daniel Holstein and Joanna Gyory.

Mesophotic coral ecosystems are buffered from environmental disturbances due to their depth and distance from shore. These deeper coral reef ecosystems may offer reproductive refuge to neighboring shallow-water coral reefs that are in decline, according to the research team.

"These deep reefs offer a glimmer of hope," said Tyler Smith, research associate professor at the University of the Virgin Islands. "They may be an incredible resource for the U.S. Virgin Islands, and for the entire Caribbean, if they can supply consistent sources of [coral](#) larvae."

The study, titled "Fertile fathoms: Deep reproductive refugia for threatened shallow corals," was published in the July 21, 2015 issue of Nature Publishing Group's journal *Scientific Reports*.

Provided by University of Miami

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